



#16

## SEQUENCE LISTING

&lt;110&gt; AKZO Nobel N.V.

&lt;120&gt; Helicobacter vaccine

&lt;130&gt; Degoedesequenties

&lt;140&gt;

&lt;141&gt;

&lt;160&gt; 21

&lt;170&gt; PatentIn Ver. 2.1

&lt;210&gt; 1

&lt;211&gt; 2883

&lt;212&gt; DNA

&lt;213&gt; Helicobacter felis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (206)..(886)

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (897)..(2603)

&lt;400&gt; 1

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taaaatttaa cacaaggagt aatag gtg aaa ctc aca ccc aaa gag caa gaa 232

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Lys Phe Leu Leu Tyr Tyr Ala Gly Glu Val Ala Arg Lys Arg Lys Ala	
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Glu Gly Leu Lys Leu Asn Gln Pro Glu Ala Ile Ala Tyr Ile Ser Ala	
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cat att atg gac gaa gcg cgc cgt gga aaa aaa acc gtt gcc cag ctt	376
His Ile Met Asp Glu Ala Arg Arg Gly Lys Lys Thr Val Ala Gln Leu	
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Met Glu Glu Cys Met His Phe Leu Lys Lys Asp Glu Val Met Pro Gly	
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gtg ggt aat atg gtt ccc gat cta ggt gta gaa gcc acc ttt cct gat	472
Val Gly Asn Met Val Pro Asp Leu Gly Val Glu Ala Thr Phe Pro Asp	
75 80 85	
ggt acg aaa ctt gta act gtg aat tgg ccc atc gaa cca gat gag cac	520
Gly Thr Lys Leu Val Thr Val Asn Trp Pro Ile Glu Pro Asp Glu His	
90 95 100 105	
ttc aaa gcg ggc gaa gtg aaa ttt ggt tgc gat aaa gac atc gag ctc	568
Phe Lys Ala Gly Glu Val Lys Phe Gly Cys Asp Lys Asp Ile Glu Leu	
110 115 120	
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Asn Ala Gly Lys Glu Val Thr Glu Leu Glu Val Thr Asn Glu Gly Pro	
125 130 135	
aaa tcc ttg cat gtg ggt agc cat ttc cac ttc ttt gaa gct aac aag	664
Lys Ser Leu His Val Gly Ser His Phe His Phe Phe Glu Ala Asn Lys	
140 145 150	
gca cta aaa ttc gat cgt gaa aaa gcc tat ggc aaa cgc cta gat att	712

Ala Leu Lys Phe Asp Arg Glu Lys Ala Tyr Gly Lys Arg Leu Asp Ile  
155 160 165

ccc tct ggc aac acg cta cgc att ggg gca gga caa acc cgc aaa gtg 760  
Pro Ser Gly Asn Thr Leu Arg Ile Gly Ala Gly Gln Thr Arg Lys Val  
170 175 180 185

cag ttg att cct ctt ggt ggc agt aaa aaa gtg att ggc atg aac ggg 808  
Gln Leu Ile Pro Leu Gly Gly Ser Lys Lys Val Ile Gly Met Asn Gly  
190 195 200

ctt gtg aat aac atc gcg gat gaa cgc cat aaa cat aaa gcg ctt gac 856  
Leu Val Asn Asn Ile Ala Asp Glu Arg His Lys His Lys Ala Leu Asp  
205 210 215

aag gcg aaa tct cac gga ttt atc aag taa ggagactccc atg aaa atg 905  
Lys Ala Lys Ser His Gly Phe Ile Lys Met Lys Met  
220 225 230

aaa aaa caa gaa tat gta aat acc tac gga ccc acc aaa ggc gat aaa 953  
Lys Lys Gln Glu Tyr Val Asn Thr Tyr Gly Pro Thr Lys Gly Asp Lys  
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Val Arg Leu Gly Asp Thr Asp Leu Trp Ala Glu Val Glu His Asp Tyr  
250 255 260

acc acc tat ggc gaa gaa ctt aaa ttt ggc gcg ggt aaa act atc cgt 1049  
Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys Thr Ile Arg  
265 270 275

gag ggt atg ggt cag agc aat agc cct gat gaa aac acc cta gat tta 1097  
Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr Leu Asp Leu  
280 285 290

gtc atc act aac gcg atg att atc gac tac acc ggg att tac aaa gcc 1145  
Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile Tyr Lys Ala  
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gac att ggg att aaa aac ggc aaa atc cat ggc att ggc aag gca gga	1193
Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly Lys Ala Gly	
315 320 325	
aac aag gac atg caa gat ggc gta agc cct cat atg gtc gtg ggt gtg	1241
Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val Val Gly Val	
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Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr Ala Gly Gly	
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Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe Pro Thr Ala	
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cta gcc aat ggc gtt aca acc atg ttt gga ggc ggc aca ggt cct gta	1385
Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Gly Thr Gly Pro Val	
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Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp Asn Leu His	
395 400 405	
cgc atg ttg cgc gca gca gaa gag tat tct atg aat gtg ggc ttt ttg	1481
Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val Gly Phe Leu	
410 415 420	
ggc aaa ggc aat agc tct agc aaa aaa caa ctt gta gaa caa gta gaa	1529
Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu Gln Val Glu	
425 430 435	
gcg ggc gcg att ggt ttt aaa ttg cat gaa gac tgg ggc aca aca cca	1577
Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly Thr Thr Pro	
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Ser	Ala	Ile	Asp	His	Cys	Leu	Ser	Val	Ala	Asp	Glu	Tyr	Asp	Val	Gln	
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gtt	tgt	atc	cac	acc	gat	aca	gtc	aat	gag	gca	ggg	tat	gta	gat	gac	1673
Val	Cys	Ile	His	Thr	Asp	Thr	Val	Asn	Glu	Ala	Gly	Tyr	Val	Asp	Asp	
				475				480						485		
acc	cta	aat	gca	atg	aac	ggg	cgc	gcc	atc	cat	gcc	tac	cac	att	gag	1721
Thr	Leu	Asn	Ala	Met	Asn	Gly	Arg	Ala	Ile	His	Ala	Tyr	His	Ile	Glu	
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gga	gcg	ggg	gga	gga	cac	tca	cct	gat	gtt	atc	acc	atg	gca	ggc	gag	1769
Gly	Ala	Gly	Gly	Gly	His	Ser	Pro	Asp	Val	Ile	Thr	Met	Ala	Gly	Glu	
		505					510					515				
ctc	aat	att	cta	ccc	tcc	tcc	acc	acc	ccc	act	att	ccc	tat	acc	att	1817
Leu	Asn	Ile	Leu	Pro	Ser	Ser	Thr	Thr	Pro	Thr	Ile	Pro	Tyr	Thr	Ile	
	520					525				530						
aat	acg	gtt	gca	gaa	cac	tta	gac	atg	ctc	atg	aca	tgc	cac	cac	cta	1865
Asn	Thr	Val	Ala	Glu	His	Leu	Asp	Met	Leu	Met	Thr	Cys	His	His	Leu	
535					540				545						550	
gac	aaa	cgc	atc	cgc	gag	gat	tta	caa	ttt	tct	caa	agc	cgt	atc	cgc	1913
Asp	Lys	Arg	Ile	Arg	Glu	Asp	Leu	Gln	Phe	Ser	Gln	Ser	Arg	Ile	Arg	
				555				560						565		
ccc	ggc	tct	atc	gcg	gct	gaa	gat	gtg	ctc	cat	gat	atg	ggg	gtg	atc	1961
Pro	Gly	Ser	Ile	Ala	Ala	Glu	Asp	Val	Leu	His	Asp	Met	Gly	Val	Ile	
			570					575					580			
gcg	atg	aca	agc	tcg	gat	tcg	caa	gca	atg	ggg	cgt	gca	ggc	gaa	gtg	2009
Ala	Met	Thr	Ser	Ser	Asp	Ser	Gln	Ala	Met	Gly	Arg	Ala	Gly	Glu	Val	
		585					590					595				
att	cct	cga	act	tgg	cag	act	gcg	gat	aag	aat	aaa	aaa	gaa	ttt	ggg	2057
Ile	Pro	Arg	Thr	Trp	Gln	Thr	Ala	Asp	Lys	Asn	Lys	Lys	Glu	Phe	Gly	
	600					605					610					

aag ctt cct gaa gat ggc aaa gat aac gat aat ttc cgc att aag cgc	2105
Lys Leu Pro Glu Asp Gly Lys Asp Asn Asp Asn Phe Arg Ile Lys Arg	
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tac atc tcc aaa tac act atc aac ccc gct ttg acc cac ggc gtg agc	2153
Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His Gly Val Ser	
635                                  640                                  645	
gag tat atc ggc tct gtg gaa gag ggc aag atc gcc gac ttg gtg gtg	2201
Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp Leu Val Val	
650                                  655                                  660	
tgg aat cct gcc ttt ttt ggc gta aaa ccc aaa atc gtg atc aaa ggc	2249
Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val Ile Lys Gly	
665                                  670                                  675	
ggt atg gtg gtc ttc tct gaa atg ggc gat tct aac gcg tct gtg ccc	2297
Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala Ser Val Pro	
680                                  685                                  690	
act ccc caa ccg gtt tat tac cgc gaa atg ttt ggg cat cac ggc aag	2345
Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His His Gly Lys	
695                                  700                                  705                                  710	
gcg aaa ttt gac acc agc atc act ttt gtt tcc aaa gtc gcc tat gaa	2393
Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val Ala Tyr Glu	
715                                  720                                  725	
aat ggc gtg aaa gaa aag ctg ggc tta gag cgc caa gtt cta ccg gtc	2441
Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Gln Val Leu Pro Val	
730                                  735                                  740	
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Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp Phe Lys Phe Asn Asp Lys	
745                                  750                                  755	
acg gca aaa atc acc gtc gat ccg aaa acc ttc gag gtc ttt gta gat	2537

Thr Ala Lys Ile Thr Val Asp Pro Lys Thr Phe Glu Val Phe Val Asp  
 760 765 770

ggc aaa ctc tgc acc tct aaa ccc acc tcg caa gtg cct cta gcc cag 2585  
 Gly Lys Leu Cys Thr Ser Lys Pro Thr Ser Gln Val Pro Leu Ala Gln  
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cgc tac act ttc ttc tag gcacaatgcc ccctttgggg gcagggttatt 2633  
 Arg Tyr Thr Phe Phe  
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ttaggaatct tcatcaaacg cacctgcaat cggctcttgcg tgtgcatcg tgtcgcttta 2693

aaacaacttt tcatctttaa gcaatcgcca tttttaatta atttaattct tataattaat 2753

attatattat gccccctcat ttttaaagga gaattatgcg taggtctttg gtattgctat 2813

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<211> 226

<212> PRT

<213> Helicobacter felis

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Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg  
 35 40 45

Arg Gly Lys Lys Thr Val Ala Gln Leu Met Glu Glu Cys Met His Phe

50

55

60

Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp  
 65 70 75 80

Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val  
 85 90 95

Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys  
 100 105 110

Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr  
 115 120 125

Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser  
 130 135 140

His Phe His Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu  
 145 150 155 160

Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg  
 165 170 175

Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly  
 180 185 190

Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp  
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Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe  
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Ile Lys  
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<212> PRT

<213> Helicobacter felis

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His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys  
35 40 45

Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr  
50 55 60

Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile  
65 70 75 80

Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly  
85 90 95

Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val  
100 105 110

Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr  
115 120 125

Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe  
130 135 140

Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Gly Thr  
145 150 155 160

Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp  
165 170 175

Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val

180	185	190
Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu		
195	200	205
Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly		
210	215	220
Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr		
225	230	235 240
Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr		
245	250	255
Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr		
260	265	270
His Ile Glu Gly Ala Gly Gly Gly His Ser Pro Asp Val Ile Thr Met		
275	280	285
Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro		
290	295	300
Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys		
305	310	315 320
His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser		
325	330	335
Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu His Asp Met		
340	345	350
Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met Gly Arg Ala		
355	360	365
Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys		
370	375	380

Glu Phe Gly Lys Leu Pro Glu Asp Gly Lys Asp Asn Asp Asn Phe Arg  
385 390 395 400

Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His  
405 410 415

Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp  
420 425 430

Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val  
435 440 445

Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala  
450 455 460

Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His  
465 470 475 480

His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val  
485 490 495

Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Gln Val  
500 505 510

Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp Phe Lys Phe  
515 520 525

Asn Asp Lys Thr Ala Lys Ile Thr Val Asp Pro Lys Thr Phe Glu Val  
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Leu Ala Gln Arg Tyr Thr Phe Phe  
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<210> 4

<211> 2405

<212> DNA

<213> Helicobacter felis

<220>

<221> CDS

<222> (1)..(681)

<220>

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<222> (692)..(2398)

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ggc gaa gtg gct aga aag cgc aaa gca gag ggc tta aag ctc aat caa 96  
Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln  
20 25 30

ccc gaa gcc att gcc tac att agt gcc cat att atg gac gag gcg cgc 144  
Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg  
35 40 45

cgt ggc aaa aaa acc gtt gct gaa ctt atg gaa gaa tgt atg cac ttt 192  
Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe  
50 55 60

ttg aaa aaa gat gag gtg atg ccc ggt gtg ggg aat atg gtc cct gat 240  
Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp  
65 70 75 80

ttg ggc gta gaa gcc act ttc ccc gat ggc acc aaa ctc gta acc gtg 288  
Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val  
85 90 95

aat tgg ccc att gaa cct gat gaa cac ttt aaa gcc ggt gaa gtg aaa 336  
 Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys  
 100 105 110

ttt ggc tgt gat aaa gac att gag ctc aac gcg ggt aag gaa gtt acc 384  
 Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr  
 115 120 125

gag ctt gaa gtt acc aac gaa gga cct aaa tcc ttg cat gtg ggt agc 432  
 Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser  
 130 135 140

cat ttc cac ttc ttt gaa acc aac aag gca ttg aaa ttc gat cgg gaa 480  
 His Phe His Phe Phe Glu Thr Asn Lys Ala Leu Lys Phe Asp Arg Glu  
 145 150 155 160

aaa gcc tat ggc aaa cgc cta gat att ccc tct ggc aac acg cta cgc 528  
 Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg  
 165 170 175

att ggg gca gga caa acc cgt aaa gtg cag tta atc cct ctt ggc ggt 576  
 Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly  
 180 185 190

agt aaa aaa gtg att ggc atg aac ggg ctt gtg aat aat att gcg gac 624  
 Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp  
 195 200 205

gaa cgc cat aaa cac aaa gca cta gac aag gca aaa tct cac gga ttc 672  
 Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe  
 210 215 220

atc aag taa ggagactccc atg aaa atg aaa aaa caa gag tat gta aac 721  
 Ile Lys Met Lys Met Lys Lys Gln Glu Tyr Val Asn  
 225 230 235

acc tac gga ccc acc aca ggc gat aaa gtg cgc tta gga gat acc gat 769  
 Thr Tyr Gly Pro Thr Thr Gly Asp Lys Val Arg Leu Gly Asp Thr Asp

240	245	250	
ctt tgg gca gaa gta gaa cat gac tat acc act tat ggc gaa gag ctc			817
Leu Trp Ala Glu Val Glu His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu			
255	260	265	
aaa ttt ggc gcg ggt aaa act atc cgt gag ggt atg ggt cag agc aat			865
Lys Phe Gly Ala Gly Lys Thr Ile Arg Glu Gly Met Gly Gln Ser Asn			
270	275	280	285
agc cca gat gaa aac acc tta gat tta gtg atc acc aac gcg atg att			913
Ser Pro Asp Glu Asn Thr Leu Asp Leu Val Ile Thr Asn Ala Met Ile			
290	295	300	
atc gac tac acc ggg att tat aaa gcc gac att ggt att aaa aat ggc			961
Ile Asp Tyr Thr Gly Ile Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly			
305	310	315	
aaa atc cat ggt att ggc aag gcg ggg aac aaa gac atg caa gat ggc			1009
Lys Ile His Gly Ile Gly Lys Ala Gly Asn Lys Asp Met Gln Asp Gly			
320	325	330	
gta agc cct cat atg gtc gtg ggt gtg ggc aca gaa gca cta gca ggg			1057
Val Ser Pro His Met Val Val Gly Val Gly Thr Glu Ala Leu Ala Gly			
335	340	345	
gaa ggt atg att att acc gct ggg ggg atc gat tcg cac acc cac ttc			1105
Glu Gly Met Ile Ile Thr Ala Gly Gly Ile Asp Ser His Thr His Phe			
350	355	360	365
ctc tct ccc caa caa ttc cct acc gct cta gcc aat ggt gtt aca acc			1153
Leu Ser Pro Gln Gln Phe Pro Thr Ala Leu Ala Asn Gly Val Thr Thr			
370	375	380	
atg ttt gga ggt ggc aca ggt ccg gta gat ggc acg aat gcg acc acc			1201
Met Phe Gly Gly Gly Thr Gly Pro Val Asp Gly Thr Asn Ala Thr Thr			
385	390	395	

atc act ccg ggc aaa tgg aac ttg cac cgc atg ttg cgc gca gct gaa	1249
Ile Thr Pro Gly Lys Trp Asn Leu His Arg Met Leu Arg Ala Ala Glu	
400 405 410	
gag tat tct atg aat gtg ggc ttt ttg ggc aaa ggc aat agc tcc agt	1297
Glu Tyr Ser Met Asn Val Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser	
415 420 425	
aaa aaa caa ctc gta gaa caa gta gaa gcg ggc gcg att ggc ttt aaa	1345
Lys Lys Gln Leu Val Glu Gln Val Glu Ala Gly Ala Ile Gly Phe Lys	
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Leu His Glu Asp Trp Gly Thr Thr Pro Ser Ala Ile Asp His Cys Leu	
450 455 460	
agc gta gca gat gaa tac gat gtg caa gtt tgt atc cac acc gat acg	1441
Ser Val Ala Asp Glu Tyr Asp Val Gln Val Cys Ile His Thr Asp Thr	
465 470 475	
gtc aat gag gca ggt tat gta gat gac acc cta aat gcg atg aac ggg	1489
Val Asn Glu Ala Gly Tyr Val Asp Asp Thr Leu Asn Ala Met Asn Gly	
480 485 490	
cgc gcc atc cat gcc tac cac att gag gga gcg ggc gga gga cac tca	1537
Arg Ala Ile His Ala Tyr His Ile Glu Gly Ala Gly Gly Gly His Ser	
495 500 505	
cct gat gtt atc acc atg gca ggc gag ctc aat att cta ccc tcc tcc	1585
Pro Asp Val Ile Thr Met Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser	
510 515 520 525	
acc acc ccc act att ccc tat acc att aat acg gtt gca gaa cac tta	1633
Thr Thr Pro Thr Ile Pro Tyr Thr Ile Asn Thr Val Ala Glu His Leu	
530 535 540	
gac atg ctc atg acc tgc cac cac cta gac aaa cgc atc cgc gag gat	1681
Asp Met Leu Met Thr Cys His His Leu Asp Lys Arg Ile Arg Glu Asp	

545	550	555	
ctc cag ttt tcc caa agc cgt atc cgc ccc ggc tct att gcc gct gaa			1729
Leu Gln Phe Ser Gln Ser Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu			
560	565	570	
gat gtg ctc cat gat att ggc gtg atc gcg atg aca agc tcg gat tcg			1777
Asp Val Leu His Asp Ile Gly Val Ile Ala Met Thr Ser Ser Asp Ser			
575	580	585	
caa gca atg ggg cgc gct ggg gaa gtg att cct aga act tgg caa act			1825
Gln Ala Met Gly Arg Ala Gly Glu Val Ile Pro Arg Thr Trp Gln Thr			
590	595	600	605
gca gac aag aat aaa aaa gaa ttt ggt aag ctt cct gaa gat ggt gca			1873
Ala Asp Lys Asn Lys Lys Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala			
610	615	620	
gat aat gac aac ttc cgc atc aaa cgc tat atc tcc aaa tac acc att			1921
Asp Asn Asp Asn Phe Arg Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile			
625	630	635	
aat ccc gct ttg acc cat ggc gtg agc gag tat atc ggc tct gtg gaa			1969
Asn Pro Ala Leu Thr His Gly Val Ser Glu Tyr Ile Gly Ser Val Glu			
640	645	650	
gag ggc aag atc gcc gac ttg gtg gtg tgg aat cct gct ttc ttt ggt			2017
Glu Gly Lys Ile Ala Asp Leu Val Val Trp Asn Pro Ala Phe Phe Gly			
655	660	665	
gta aaa ccc aaa atc gtg atc aaa ggc ggt atg gtg gtg ttc tct gaa			2065
Val Lys Pro Lys Ile Val Ile Lys Gly Gly Met Val Val Phe Ser Glu			
670	675	680	685
atg ggc gat tct aac gcg tct gtg ccc aca cct cag ccg gtt tat tac			2113
Met Gly Asp Ser Asn Ala Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr			
690	695	700	

cgc gaa atg ttt ggg cat cac ggc aag gcg aaa ttt gac acc agc atc 2161  
 Arg Glu Met Phe Gly His His Gly Lys Ala Lys Phe Asp Thr Ser Ile  
 705 710 715

act ttt gtt tcc aaa gtc gcc tat gaa aat ggc gtg aaa gaa aaa cta 2209  
 Thr Phe Val Ser Lys Val Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu  
 720 725 730

ggc tta gag cgc aag gtg cta ccc gtg aaa aac tgc cgc aac atc act 2257  
 Gly Leu Glu Arg Lys Val Leu Pro Val Lys Asn Cys Arg Asn Ile Thr  
 735 740 745

aag aaa gac ttc aaa ttc aac aac aag acg gcg cat atc act gtc gat 2305  
 Lys Lys Asp Phe Lys Phe Asn Asn Lys Thr Ala His Ile Thr Val Asp  
 750 755 760 765

cct aaa acc ttc gag gtc ttt gta gat ggc aaa ctc tgc acc tct aaa 2353  
 Pro Lys Thr Phe Glu Val Phe Val Asp Gly Lys Leu Cys Thr Ser Lys  
 770 775 780

ccc gcc tct gaa gtg cct cta gcc caa cgc tac act ttc ttc tag 2398  
 Pro Ala Ser Glu Val Pro Leu Ala Gln Arg Tyr Thr Phe Phe  
 785 790 795

gcacaat 2405

<210> 5

<211> 226

<212> PRT

<213> Helicobacter felis

<400> 5

Val Lys Leu Thr Pro Lys Glu Gln Glu Lys Phe Leu Leu Tyr Tyr Ala  
 1 5 10 15

Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln  
 20 25 30

Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg  
35 40 45

Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe  
50 55 60

Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp  
65 70 75 80

Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val  
85 90 95

Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys  
100 105 110

Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr  
115 120 125

Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser  
130 135 140

His Phe His Phe Phe Glu Thr Asn Lys Ala Leu Lys Phe Asp Arg Glu  
145 150 155 160

Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg  
165 170 175

Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly  
180 185 190

Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp  
195 200 205

Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe  
210 215 220

Ile Lys

225

<210> 6

<211> 568

<212> PRT

<213> *Helicobacter felis*

<400> 6

Met	Lys	Met	Lys	Lys	Gln	Glu	Tyr	Val	Asn	Thr	Tyr	Gly	Pro	Thr	Thr
1			5					10					15		

Gly	Asp	Lys	Val	Arg	Leu	Gly	Asp	Thr	Asp	Leu	Trp	Ala	Glu	Val	Glu
			20					25					30		

His	Asp	Tyr	Thr	Thr	Tyr	Gly	Glu	Glu	Leu	Lys	Phe	Gly	Ala	Gly	Lys
		35						40					45		

Thr	Ile	Arg	Glu	Gly	Met	Gly	Gln	Ser	Asn	Ser	Pro	Asp	Glu	Asn	Thr
	50					55					60				

Leu	Asp	Leu	Val	Ile	Thr	Asn	Ala	Met	Ile	Ile	Asp	Tyr	Thr	Gly	Ile
65					70					75					80

Tyr	Lys	Ala	Asp	Ile	Gly	Ile	Lys	Asn	Gly	Lys	Ile	His	Gly	Ile	Gly
				85					90					95	

Lys	Ala	Gly	Asn	Lys	Asp	Met	Gln	Asp	Gly	Val	Ser	Pro	His	Met	Val
			100					105					110		

Val	Gly	Val	Gly	Thr	Glu	Ala	Leu	Ala	Gly	Glu	Gly	Met	Ile	Ile	Thr
		115					120					125			

Ala	Gly	Gly	Ile	Asp	Ser	His	Thr	His	Phe	Leu	Ser	Pro	Gln	Gln	Phe
	130						135				140				

Pro	Thr	Ala	Leu	Ala	Asn	Gly	Val	Thr	Thr	Met	Phe	Gly	Gly	Gly	Thr
145					150					155					160

Gly	Pro	Val	Asp	Gly	Thr	Asn	Ala	Thr	Thr	Ile	Thr	Pro	Gly	Lys	Trp
				165					170					175	
Asn	Leu	His	Arg	Met	Leu	Arg	Ala	Ala	Glu	Glu	Tyr	Ser	Met	Asn	Val
				180				185						190	
Gly	Phe	Leu	Gly	Lys	Gly	Asn	Ser	Ser	Ser	Lys	Lys	Gln	Leu	Val	Glu
				195				200						205	
Gln	Val	Glu	Ala	Gly	Ala	Ile	Gly	Phe	Lys	Leu	His	Glu	Asp	Trp	Gly
				210				215						220	
Thr	Thr	Pro	Ser	Ala	Ile	Asp	His	Cys	Leu	Ser	Val	Ala	Asp	Glu	Tyr
				225				230						235	240
Asp	Val	Gln	Val	Cys	Ile	His	Thr	Asp	Thr	Val	Asn	Glu	Ala	Gly	Tyr
				245					250					255	
Val	Asp	Asp	Thr	Leu	Asn	Ala	Met	Asn	Gly	Arg	Ala	Ile	His	Ala	Tyr
				260					265					270	
His	Ile	Glu	Gly	Ala	Gly	Gly	Gly	His	Ser	Pro	Asp	Val	Ile	Thr	Met
				275					280					285	
Ala	Gly	Glu	Leu	Asn	Ile	Leu	Pro	Ser	Ser	Thr	Thr	Pro	Thr	Ile	Pro
				290					295					300	
Tyr	Thr	Ile	Asn	Thr	Val	Ala	Glu	His	Leu	Asp	Met	Leu	Met	Thr	Cys
				305					310					315	320
His	His	Leu	Asp	Lys	Arg	Ile	Arg	Glu	Asp	Leu	Gln	Phe	Ser	Gln	Ser
				325						330				335	
Arg	Ile	Arg	Pro	Gly	Ser	Ile	Ala	Ala	Glu	Asp	Val	Leu	His	Asp	Ile
				340						345				350	
Gly	Val	Ile	Ala	Met	Thr	Ser	Ser	Asp	Ser	Gln	Ala	Met	Gly	Arg	Ala

355		360		365
Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys				
370		375		380
Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp Asn Phe Arg				
385		390		395 400
Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His				
	405		410	415
Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp				
	420		425	430
Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val				
	435		440	445
Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala				
	450		455	460
Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His				
465		470		475 480
His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val				
	485		490	495
Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Lys Val				
	500		505	510
Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp Phe Lys Phe				
	515		520	525
Asn Asn Lys Thr Ala His Ile Thr Val Asp Pro Lys Thr Phe Glu Val				
	530		535	540
Phe Val Asp Gly Lys Leu Cys Thr Ser Lys Pro Ala Ser Glu Val Pro				
545		550		555 560

Leu Ala Gln Arg Tyr Thr Phe Phe  
565

<210> 7

<211> 2183

<212> DNA

<213> Helicobacter felis

<220>

<221> CDS

<222> (3)..(683)

<220>

<221> CDS

<222> (694)..(2181)

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1 5 10 15

gcg ggc gaa gtg gct aga aag cgc aaa gca gag ggc tta aag ctc aat 95  
Ala Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn  
20 25 30

caa ccc gaa gcc att gcc tac att agt gcc cat att atg gac gag gcg 143  
Gln Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala  
35 40 45

cgc cgt ggc aaa aaa acc gtt gct gaa ctt atg gaa gaa tgt atg cac 191  
Arg Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His  
50 55 60

ttt ttg aaa aaa gat gag gtg atg ccc ggt gtg ggg aat atg gtc cct 239  
Phe Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro  
65 70 75

gat ttg ggc gta gaa gcc act ttc ccc gat ggc acc aaa ctc gta acc	287
Asp Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr	
80                                      85                                      90                                      95	
gtg aat tgg ccc att gaa cct gat gaa cac ttt aaa gcc ggt gaa gtg	335
Val Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val	
100                                      105                                      110	
aaa ttt ggc tgt gat aaa gac att gag ctc aac gtg ggt aag gaa gtt	383
Lys Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Val Gly Lys Glu Val	
115                                      120                                      125	
acc gag ctt gaa gtt acc aac gaa gga cct aaa tcc ttg cat gtg ggt	431
Thr Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly	
130                                      135                                      140	
agc cat ttc cac ttc ttt gaa acc aac aag gca ttg aaa ttc gat cgg	479
Ser His Phe His Phe Phe Glu Thr Asn Lys Ala Leu Lys Phe Asp Arg	
145                                      150                                      155	
gaa aaa gcc tat ggc aaa cgc cta gat att ccc tct ggc aac acg cta	527
Glu Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu	
160                                      165                                      170                                      175	
cgc att ggg gca gga caa acc cgt aaa gtg cag tta atc cct ctt ggc	575
Arg Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly	
180                                      185                                      190	
ggt agt aaa aaa gtg att ggc atg aac ggg ctt gtg aat aat att gcg	623
Gly Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala	
195                                      200                                      205	
gac gaa cgc cat aaa cac aaa gca cta gac aag gca aaa tct cac gga	671
Asp Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly	
210                                      215                                      220	
ttc atc aag taa ggagactccc atg aaa atg aaa aaa caa gag tat gta	720

Phe Ile Lys	Met Lys Met Lys Lys Gln Glu Tyr Val	
225	230	235
aac acc tac gga ccc acc aca ggc gat aaa gtg cgc tta gga gat acc	768	
Asn Thr Tyr Gly Pro Thr Thr Gly Asp Lys Val Arg Leu Gly Asp Thr		
240	245	250
gat ctt tgg gca gaa gta gaa cat gac tat acc act tat ggc gaa gag	816	
Asp Leu Trp Ala Glu Val Glu His Asp Tyr Thr Thr Tyr Gly Glu Glu		
255	260	265
ctc aaa ttt ggc gcg ggt aaa act atc cgt gag ggt atg ggt cag agc	864	
Leu Lys Phe Gly Ala Gly Lys Thr Ile Arg Glu Gly Met Gly Gln Ser		
270	275	280
aat agc cca gat gaa aac acc tta gat tta gtg atc acc aac gcg atg	912	
Asn Ser Pro Asp Glu Asn Thr Leu Asp Leu Val Ile Thr Asn Ala Met		
285	290	295
att atc gac tac acc ggg att tat aaa gcc gac att ggt att aaa aat	960	
Ile Ile Asp Tyr Thr Gly Ile Tyr Lys Ala Asp Ile Gly Ile Lys Asn		
305	310	315
ggc aaa atc cat ggt att ggc aag gcg ggg aac aaa gac atg caa gat	1008	
Gly Lys Ile His Gly Ile Gly Lys Ala Gly Asn Lys Asp Met Gln Asp		
320	325	330
ggc gta agc cct cat atg gtc gtg ggt gtg ggc aca gaa gca cta gca	1056	
Gly Val Ser Pro His Met Val Val Gly Val Gly Thr Glu Ala Leu Ala		
335	340	345
ggg gaa ggt atg att att acc gct ggg ggg atc gat tcg cac acc cac	1104	
Gly Glu Gly Met Ile Ile Thr Ala Gly Gly Ile Asp Ser His Thr His		
350	355	360
ttc ctc tct ccc caa caa ttc cct acc gct cta gcc aat ggt gtt aca	1152	
Phe Leu Ser Pro Gln Gln Phe Pro Thr Ala Leu Ala Asn Gly Val Thr		
365	370	375
		380

acc atg ttt gga ggt ggc aca ggt ccg gta gat ggc acg aat gcg acc	1200
Thr Met Phe Gly Gly Gly Thr Gly Pro Val Asp Gly Thr Asn Ala Thr	
385 390 395	
acc atc act ccg ggc aaa tgg aac ttg cac cgc atg ttg cgc gca gct	1248
Thr Ile Thr Pro Gly Lys Trp Asn Leu His Arg Met Leu Arg Ala Ala	
400 405 410	
gaa gag tat tct atg aat gta ggc ttt ttg ggc aaa ggc aat agt tct	1296
Glu Glu Tyr Ser Met Asn Val Gly Phe Leu Gly Lys Gly Asn Ser Ser	
415 420 425	
agc aaa aaa caa ctt gta gaa caa gta gaa gcg ggc gcg att ggc ttt	1344
Ser Lys Lys Gln Leu Val Glu Gln Val Glu Ala Gly Ala Ile Gly Phe	
430 435 440	
aaa ttg cat gaa gac tgg ggc aca aca cca agt gcg atc gat cac tgc	1392
Lys Leu His Glu Asp Trp Gly Thr Thr Pro Ser Ala Ile Asp His Cys	
445 450 455 460	
ttg agc gtg gca gat gaa tac gat gtg caa gtt tgt atc cac acc gat	1440
Leu Ser Val Ala Asp Glu Tyr Asp Val Gln Val Cys Ile His Thr Asp	
465 470 475	
acg gtc aat gag gca ggt tat gtg gat gac acc cta aat gca atg aac	1488
Thr Val Asn Glu Ala Gly Tyr Val Asp Asp Thr Leu Asn Ala Met Asn	
480 485 490	
ggg cgc gcc atc cat gcc tac cac att gag gga gcg ggc gga gga cac	1536
Gly Arg Ala Ile His Ala Tyr His Ile Glu Gly Ala Gly Gly Gly His	
495 500 505	
tca cct gat gtt atc acc atg gca ggc gag ctc aat att cta ccc tcc	1584
Ser Pro Asp Val Ile Thr Met Ala Gly Glu Leu Asn Ile Leu Pro Ser	
510 515 520	
tcc acc acc ccc act att ccc tat acc att aat acg gtt gca gaa cac	1632

Ser Thr Thr Pro Thr Ile Pro Tyr Thr Ile Asn Thr Val Ala Glu His	
525	530 535 540
tta gac atg ctc atg acc tgc cac cac cta gat aag cgc atc cgc gag	1680
Leu Asp Met Leu Met Thr Cys His His Leu Asp Lys Arg Ile Arg Glu	
545	550 555
gat tta caa ttt tct caa agc cgt atc cgc ccc gga tct att gcc gct	1728
Asp Leu Gln Phe Ser Gln Ser Arg Ile Arg Pro Gly Ser Ile Ala Ala	
560	565 570
gag gat gtg ctc cat gat att ggc gtg atc gcg atg act agc tcc gat	1776
Glu Asp Val Leu His Asp Ile Gly Val Ile Ala Met Thr Ser Ser Asp	
575	580 585
tcg caa gca atg ggg cgc gct ggg gaa gtg att cct aga act tgg caa	1824
Ser Gln Ala Met Gly Arg Ala Gly Glu Val Ile Pro Arg Thr Trp Gln	
590	595 600
act gca gat aag aat aaa aaa gaa ttt ggt aag ctt cct gaa gat ggt	1872
Thr Ala Asp Lys Asn Lys Lys Glu Phe Gly Lys Leu Pro Glu Asp Gly	
605	610 615 620
gca gat aac gac aac ttc cgc atc aaa cgc tat atc tcc aaa tac acc	1920
Ala Asp Asn Asp Asn Phe Arg Ile Lys Arg Tyr Ile Ser Lys Tyr Thr	
625	630 635
att aat ccc gct ttg acc cat ggc gtg agc gag tat atc ggc tct gtg	1968
Ile Asn Pro Ala Leu Thr His Gly Val Ser Glu Tyr Ile Gly Ser Val	
640	645 650
gaa gag ggc aag atc gcc gac ttg gtg gtg tgg aat cct gcc ttt ttt	2016
Glu Glu Gly Lys Ile Ala Asp Leu Val Val Trp Asn Pro Ala Phe Phe	
655	660 665
ggc gtg aaa cct aag att gtg att aaa ggt ggc atg gtg gtc ttc tct	2064
Gly Val Lys Pro Lys Ile Val Ile Lys Gly Gly Met Val Val Phe Ser	
670	675 680

gaa atg ggc gat tct aac gcg tcc gtg ccc acg cct cag ccg gtt tat 2112  
 Glu Met Gly Asp Ser Asn Ala Ser Val Pro Thr Pro Gln Pro Val Tyr  
 685 690 695 700

tac cgc gaa atg ttt ggg cac cac ggc aag gcg aaa ttt gac acc agc 2160  
 Tyr Arg Glu Met Phe Gly His His Gly Lys Ala Lys Phe Asp Thr Ser  
 705 710 715

atc act ttt cgt gtc tca agc gg 2183  
 Ile Thr Phe Arg Val Ser Ser  
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<210> 8

<211> 226

<212> PRT

<213> Helicobacter felis

<400> 8

Val Lys Leu Thr Pro Lys Glu Gln Glu Lys Phe Leu Leu Tyr Tyr Ala  
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Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln  
 20 25 30

Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg  
 35 40 45

Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe  
 50 55 60

Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp  
 65 70 75 80

Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val  
 85 90 95

Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys  
100 105 110

Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Val Gly Lys Glu Val Thr  
115 120 125

Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser  
130 135 140

His Phe His Phe Phe Glu Thr Asn Lys Ala Leu Lys Phe Asp Arg Glu  
145 150 155 160

Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg  
165 170 175

Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly  
180 185 190

Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp  
195 200 205

Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe  
210 215 220

Ile Lys  
225

<210> 9

<211> 496

<212> PRT

<213> Helicobacter felis

<400> 9

Met Lys Met Lys Lys Gln Glu Tyr Val Asn Thr Tyr Gly Pro Thr Thr  
1 5 10 15

Gly Asp Lys Val Arg Leu Gly Asp Thr Asp Leu Trp Ala Glu Val Glu

20	25	30
His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys		
35	40	45
Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr		
50	55	60
Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile		
65	70	75
Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly		
85	90	95
Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val		
100	105	110
Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr		
115	120	125
Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe		
130	135	140
Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Gly Thr		
145	150	155
Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp		
165	170	175
Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val		
180	185	190
Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu		
195	200	205
Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly		
210	215	220

Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr  
225 230 235 240

Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr  
245 250 255

Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr  
260 265 270

His Ile Glu Gly Ala Gly Gly Gly His Ser Pro Asp Val Ile Thr Met  
275 280 285

Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro  
290 295 300

Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys  
305 310 315 320

His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser  
325 330 335

Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu His Asp Ile  
340 345 350

Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met Gly Arg Ala  
355 360 365

Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys  
370 375 380

Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp Asn Phe Arg  
385 390 395 400

Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His  
405 410 415

Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp  
420 425 430

Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val  
 435 440 445

Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala  
 450 455 460

Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His  
 465 470 475 480

His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Arg Val Ser Ser  
 485 490 495

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 <211> 2407  
 <212> DNA  
 <213> Helicobacter felis

<220>  
 <221> CDS  
 <222> (2)..(682)

<220>  
 <221> CDS  
 <222> (693)..(2399)

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 Val Lys Leu Thr Pro Lys Glu Gln Glu Lys Phe Leu Leu Tyr Tyr Ala  
 1 5 10 15

ggc gaa gtg gct aga aag cgc aaa gcg gag ggc tta aag ctc aac caa 97  
 Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln  
 20 25 30

ccc gaa gcc att gcc tac att agt gcc cat att atg gac gag gcg cgc 145

Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg	
35 40 45	
cgt ggc aaa aag acc gtt gcg gaa ctt atg gaa gag tgt atg cac ttt	193
Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe	
50 55 60	
ttg aaa aaa gac gag gtg atg ccc ggt gtg ggg aat atg gtc cct gat	241
Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp	
65 70 75 80	
tta ggc gtg gaa gct act ttt ccc gat ggc acc aaa ctc gta acc gtg	289
Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val	
85 90 95	
aat tgg ccc atc gaa ccc gat gaa cac ttc aaa gcg ggc gaa gtc aaa	337
Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys	
100 105 110	
ttt ggc tgt gat aaa gac att gaa ctc aac gca ggt aag gaa gtt acc	385
Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr	
115 120 125	
gaa cta gaa gtt acc aac gaa gga cct aaa tcc ttg cat gtg ggt agc	433
Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser	
130 135 140	
cat ttc cac ttc ttt gaa gcc aac aag gca ttg aaa ttc gat cgg gaa	481
His Phe His Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu	
145 150 155 160	
aaa gcc tat ggc aaa cgc cta gat att ccc tct ggc aac acg cta cgc	529
Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg	
165 170 175	
att ggg gca gga caa acc cgt aaa gtg cag tta atc cct ctt ggc ggc	577
Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly	
180 185 190	

agt aaa aaa gtg att ggc atg aac ggg ctt gtg aat aat att gca gat	625
Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp	
195 200 205	
gaa cgc cat aaa cac aaa gcg tta gaa aaa gca aaa tct cac gga ttt	673
Glu Arg His Lys His Lys Ala Leu Glu Lys Ala Lys Ser His Gly Phe	
210 215 220	
atc aaa taa ggagactccc atg aaa atg aaa aaa caa gag tat gta aat	722
Ile Lys Met Lys Met Lys Lys Gln Glu Tyr Val Asn	
225 230 235	
acc tac gga cct acc aca ggc gac aaa gtg cgc tta gga gat acc gat	770
Thr Tyr Gly Pro Thr Thr Gly Asp Lys Val Arg Leu Gly Asp Thr Asp	
240 245 250	
ctt tgg gca gaa gta gaa cat gac tat acc act tat ggc gaa gag ctc	818
Leu Trp Ala Glu Val Glu His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu	
255 260 265	
aaa ttt ggc gcg ggt aaa act atc cgt gag ggc atg ggt cag agc aat	866
Lys Phe Gly Ala Gly Lys Thr Ile Arg Glu Gly Met Gly Gln Ser Asn	
270 275 280 285	
agt cca gat gaa aac acc cta gat tta gtc atc acc aac gcg atg att	914
Ser Pro Asp Glu Asn Thr Leu Asp Leu Val Ile Thr Asn Ala Met Ile	
290 295 300	
att gac tac acc ggg att tac aaa gcc gac att ggc att aaa aat ggc	962
Ile Asp Tyr Thr Gly Ile Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly	
305 310 315	
aaa atc cat ggc att ggc aag gca gga aac aag gac atg caa gat ggc	1010
Lys Ile His Gly Ile Gly Lys Ala Gly Asn Lys Asp Met Gln Asp Gly	
320 325 330	
gta agc cct cat atg gtc gtg ggt gtg ggc aca gaa gca tta gca ggg	1058

Val	Ser	Pro	His	Met	Val	Val	Gly	Val	Gly	Thr	Glu	Ala	Leu	Ala	Gly		
335							340					345					
gaa ggt atg att att acc gct ggg ggg atc gat tca cac acc cac ttc 1106																	
Glu	Gly	Met	Ile	Ile	Thr	Ala	Gly	Gly	Ile	Asp	Ser	His	Thr	His	Phe		
350					355					360					365		
ctc tct cca caa caa ttc cct acc gct cta gcc aat ggc gtt aca acc 1154																	
Leu	Ser	Pro	Gln	Gln	Phe	Pro	Thr	Ala	Leu	Ala	Asn	Gly	Val	Thr	Thr		
			370						375					380			
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Met	Phe	Gly	Gly	Gly	Thr	Gly	Pro	Val	Asp	Gly	Thr	Asn	Ala	Thr	Thr		
		385						390					395				
atc act ccg ggc aaa tgg aac ttg cac cgc atg ttg cgc gca gct gaa 1250																	
Ile	Thr	Pro	Gly	Lys	Trp	Asn	Leu	His	Arg	Met	Leu	Arg	Ala	Ala	Glu		
		400					405					410					
gag tat tct atg aat gtg ggc ttt ttg ggc aaa ggc aat agc tcc agt 1298																	
Glu	Tyr	Ser	Met	Asn	Val	Gly	Phe	Leu	Gly	Lys	Gly	Asn	Ser	Ser	Ser		
	415					420					425						
aaa aaa caa ctt gta gaa caa ata gaa gcg ggc gcg atc ggc ttt aaa 1346																	
Lys	Lys	Gln	Leu	Val	Glu	Gln	Ile	Glu	Ala	Gly	Ala	Ile	Gly	Phe	Lys		
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ttg cat gaa gac tgg ggc aca act cca agt gca atc gat cac tgc ttg 1394																	
Leu	His	Glu	Asp	Trp	Gly	Thr	Thr	Pro	Ser	Ala	Ile	Asp	His	Cys	Leu		
			450						455					460			
agc gta gca gat gaa tac gat gtg caa gtt tgt atc cac acc gat acg 1442																	
Ser	Val	Ala	Asp	Glu	Tyr	Asp	Val	Gln	Val	Cys	Ile	His	Thr	Asp	Thr		
		465						470				475					
gtc aat gag gca ggt tat gta gat gac acc ctg aat gcg atg aac ggg 1490																	
Val	Asn	Glu	Ala	Gly	Tyr	Val	Asp	Asp	Thr	Leu	Asn	Ala	Met	Asn	Gly		
	480						485					490					

cgc gcc atc cat gcc tac cac att gag gga gcg ggc gga gga cac tca	1538
Arg Ala Ile His Ala Tyr His Ile Glu Gly Ala Gly Gly Gly His Ser	
495 500 505	
cct gat gtt atc acc atg gca ggc gag ctc aat att cta ccc tcc tcc	1586
Pro Asp Val Ile Thr Met Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser	
510 515 520 525	
aca acc ccc act atc ccc tat acc att aat acg gtt gca gaa cac tta	1634
Thr Thr Pro Thr Ile Pro Tyr Thr Ile Asn Thr Val Ala Glu His Leu	
530 535 540	
gac atg ctc atg acc tgc cac cac cta gat aaa cgc atc cgc gag gat	1682
Asp Met Leu Met Thr Cys His His Leu Asp Lys Arg Ile Arg Glu Asp	
545 550 555	
tta caa ttt tcc caa agc cgt atc cgc ccc ggc tct atc gcc gct gaa	1730
Leu Gln Phe Ser Gln Ser Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu	
560 565 570	
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Asp Val Leu His Asp Ile Gly Val Ile Ala Met Thr Ser Ser Asp Ser	
575 580 585	
caa gca atg ggg cgc gct ggc gaa gtg att cct cga act tgg cag act	1826
Gln Ala Met Gly Arg Ala Gly Glu Val Ile Pro Arg Thr Trp Gln Thr	
590 595 600 605	
gcg gat aag aat aaa aaa gaa ttt ggt aag ctt cct gaa gat agt gca	1874
Ala Asp Lys Asn Lys Lys Glu Phe Gly Lys Leu Pro Glu Asp Ser Ala	
610 615 620	
gat aac gac aac ttc cgt atc aaa cgc tac atc tcc aaa tac act att	1922
Asp Asn Asp Asn Phe Arg Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile	
625 630 635	
aac ccc gct cta acc cat ggg gta agc gag tat atc ggc tct gtg gaa	1970

Asn Pro Ala Leu Thr His Gly Val Ser Glu Tyr Ile Gly Ser Val Glu	
640 645 650	
gag ggc aaa atc gct gat ttg gtg gtg tgg aat cct gcc ttt ttt ggt	2018
Glu Gly Lys Ile Ala Asp Leu Val Val Trp Asn Pro Ala Phe Phe Gly	
655 660 665	
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Val Lys Pro Lys Ile Val Ile Lys Gly Gly Met Val Val Phe Ser Glu	
670 675 680 685	
atg ggc gac tcc aac gcg tcc gtg cct aca cct cag ccg gtt tat tac	2114
Met Gly Asp Ser Asn Ala Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr	
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Arg Glu Met Phe Gly His His Gly Lys Ala Lys Phe Asp Thr Ser Ile	
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act ttt gtt tcc aaa gtc gcc tat gaa aat ggc gtg aaa gaa aaa cta	2210
Thr Phe Val Ser Lys Val Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu	
720 725 730	
ggc tta gag cgc aag gtg cta ccc gtg aaa aac tgc cgc aac atc act	2258
Gly Leu Glu Arg Lys Val Leu Pro Val Lys Asn Cys Arg Asn Ile Thr	
735 740 745	
aag aaa gac ttc aaa ttc aac aac aag acg gcg cat atc act gtc gat	2306
Lys Lys Asp Phe Lys Phe Asn Asn Lys Thr Ala His Ile Thr Val Asp	
750 755 760 765	
cct aaa acc ttc gag gtc ttt gta gat ggc aaa ctc tgc acc tct aaa	2354
Pro Lys Thr Phe Glu Val Phe Val Asp Gly Lys Leu Cys Thr Ser Lys	
770 775 780	
ccc gcc tct gaa gtg cct cta gcc cag cgc tac act ttc ttc tag	2399
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gcncaatg

2407

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<212> PRT

<213> *Helicobacter felis*

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35 40 45

Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe  
50 55 60

Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp  
65 70 75 80

Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val  
85 90 95

Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys  
100 105 110

Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr  
115 120 125

Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser  
130 135 140

His Phe His Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu

145                                      150                                      155                                      160  
 Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg  
    165                                      170                                      175  
 Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly  
    180                                      185                                      190  
 Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp  
    195                                      200                                      205  
 Glu Arg His Lys His Lys Ala Leu Glu Lys Ala Lys Ser His Gly Phe  
    210                                      215                                      220  
  
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    20                                      25                                      30  
  
 His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys  
    35                                      40                                      45  
  
 Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr  
    50                                      55                                      60  
  
 Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile  
       65                                      70                                      75                                      80

Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly  
85 90 95

Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val  
100 105 110

Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr  
115 120 125

Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe  
130 135 140

Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Gly Thr  
145 150 155 160

Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp  
165 170 175

Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val  
180 185 190

Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu  
195 200 205

Gln Ile Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly  
210 215 220

Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr  
225 230 235 240

Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr  
245 250 255

Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr  
260 265 270

His Ile Glu Gly Ala Gly Gly Gly His Ser Pro Asp Val Ile Thr Met

275	280	285
Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro		
290	295	300
Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys		
305	310	315 320
His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser		
325	330	335
Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu His Asp Ile		
340	345	350
Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met Gly Arg Ala		
355	360	365
Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys		
370	375	380
Glu Phe Gly Lys Leu Pro Glu Asp Ser Ala Asp Asn Asp Asn Phe Arg		
385	390	395 400
Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His		
405	410	415
Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp		
420	425	430
Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val		
435	440	445
Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala		
450	455	460
Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His		
465	470	475 480

His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val  
 485 490 495

Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Lys Val  
 500 505 510

Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp Phe Lys Phe  
 515 520 525

Asn Asn Lys Thr Ala His Ile Thr Val Asp Pro Lys Thr Phe Glu Val  
 530 535 540

Phe Val Asp Gly Lys Leu Cys Thr Ser Lys Pro Ala Ser Glu Val Pro  
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Leu Ala Gln Arg Tyr Thr Phe Phe  
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Thr Pro Lys Glu Gln Glu Lys Phe Leu Leu Tyr Tyr Ala Gly Glu Val	
5 10 15	
gct aga aag cgc aaa gca gag ggc tta aag ctc aac caa ccc gaa gcc	152
Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln Pro Glu Ala	
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att gcc tac att agt gcc cat att atg gac gag gcg cgt cgt ggc aaa	200
Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg Arg Gly Lys	
40 45 50	
aaa acc gtt gcg gaa ctt atg gaa gag tgt atg cac ttt ttg aaa aaa	248
Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe Leu Lys Lys	
55 60 65	
gac gag gtg atg ccc ggg gtg ggg aat atg gtc cct gat ttg ggc gtg	296
Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp Leu Gly Val	
70 75 80	
gaa gcc act ttc ccc gat ggc acc aaa ctc gta act gtg aat tgg ccc	344
Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val Asn Trp Pro	
85 90 95	
atc gaa cct gat gaa cac ttt aag gcg ggt gaa gtg aaa ttt ggc tgt	392
Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys Phe Gly Cys	
100 105 110 115	
gat aaa gac att gaa ctc aac gca ggt aag gaa gtt acc gaa cta gaa	440
Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr Glu Leu Glu	
120 125 130	
gtt act aac gaa gga cct aaa tcc ttg cat gtg ggt agc cat ttc cac	488
Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser His Phe His	
135 140 145	
ttc ttt gaa gcc aac aaa gca ttg aaa ttc gat cgg gaa aaa gcc tat	536
Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu Lys Ala Tyr	

150	155	160	
ggc aaa cgc cta gat att ccc tct ggc aac aca cta cgc att ggg gca			584
Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg Ile Gly Ala			
165	170	175	
gga caa acc cgt aaa gtg cag tta atc cct ctt ggc ggt agt aaa aaa			632
Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly Ser Lys Lys			
180	185	190	195
gtg att ggc atg aac ggg ctt gtg aat aat att gcg gac gaa cgc cat			680
Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp Glu Arg His			
200	205	210	
aaa cac aaa gcg cta gac aaa gca aaa tct cac gga ttt atc aag taa			728
Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe Ile Lys			
215	220	225	
ggagactccc atg aaa atg aaa aaa caa gag tat gta aat acc tac gga			777
Met Lys Met Lys Lys Gln Glu Tyr Val Asn Thr Tyr Gly			
230	235	240	
ccc acc aca ggc gat aaa gtg cgc tta gga gat acc gat ctt tgg gca			825
Pro Thr Thr Gly Asp Lys Val Arg Leu Gly Asp Thr Asp Leu Trp Ala			
245	250	255	
gaa gta gaa cat gac tat acc acc tat ggc gaa gaa ctc aaa ttc ggt			873
Glu Val Glu His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly			
260	265	270	
gca ggt aaa act atc cgt gag ggt atg ggt cag agc aat agc cca gat			921
Ala Gly Lys Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp			
275	280	285	
gaa aac acc tta gat tta gtg atc acc aac gcg atg att att gac tac			969
Glu Asn Thr Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr			
290	295	300	

acc ggg att tac aaa gcc gac att ggc att aaa aat ggc aaa atc cat	1017
Thr Gly Ile Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His	
305                      310                      315                      320	
ggc att ggc aag gca gga aac aag gac atg caa gat ggc gta agc cct	1065
Gly Ile Gly Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro	
325                      330                      335	
cat atg gtc gtg ggt gtg ggc aca gaa gca cta gca ggg gaa ggt atg	1113
His Met Val Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met	
340                      345                      350	
att att acc gct ggg ggg atc gat tca cac acc cac ttc ctc tct cca	1161
Ile Ile Thr Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro	
355                      360                      365	
caa caa ttc cct acc gct cta gcc aat ggc gtt aca aca atg ttt ggc	1209
Gln Gln Phe Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly	
370                      375                      380	
ggg ggc aca ggc ccc gta gat ggc acg aat gcg act acc atc act ccg	1257
Gly Gly Thr Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro	
385                      390                      395                      400	
ggc aaa tgg aac ttg cac cgc atg ttg cgc gca gca gaa gag tat tct	1305
Gly Lys Trp Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser	
405                      410                      415	
atg aat gtg ggc ttt ttg ggc aaa ggc aat agc tct agt aaa aaa caa	1353
Met Asn Val Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln	
420                      425                      430	
ctt gta gaa caa gta gaa gcg ggc gcg att ggt ttt aaa ttg cat gaa	1401
Leu Val Glu Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu	
435                      440                      445	
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Asp Trp Gly Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala	

450

455

460

gat gaa tac gat gtg caa gtt tgt ata cac acc gat acg gtc aat gag 1497  
 Asp Glu Tyr Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu  
 465 470 475 480

gca ggt tat gta gat gac acc cta aat gca atg aac ggg cgc gcc atc 1545  
 Ala Gly Tyr Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile  
 485 490 495

cat gcc tac cac att gag gga gcg ggt gga gga cac tca cct gat gtt 1593  
 His Ala Tyr His Ile Glu Gly Ala Gly Gly Gly His Ser Pro Asp Val  
 500 505 510

atc acc atg gca ggc gaa gtg aat att cta ccc tcc tcc aca acc cct 1641  
 Ile Thr Met Ala Gly Glu Val Asn Ile Leu Pro Ser Ser Thr Thr Pro  
 515 520 525

act atc ccc tat acc att aat acg gtt gca gaa cac tta gac atg ctt 1689  
 Thr Ile Pro Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu  
 530 535 540

atg acc tgc cac cac cta gat aaa cgc atc cgc gag gat ctc caa ttt 1737  
 Met Thr Cys His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe  
 545 550 555 560

tct caa agc cgt atc cgc ccc ggc tct atc gcc gct gaa gat gtg ctc 1785  
 Ser Gln Ser Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu  
 565 570 575

cat gat atc ggt gtg atc gcg atg aca agt tcc gat tcg caa gca atg 1833  
 His Asp Ile Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met  
 580 585 590

ggg cgc gct ggg gaa gtg att cct aga act tgg caa act gca gac aag 1881  
 Gly Arg Ala Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys  
 595 600 605

aat aaa aaa gaa ttt ggt aag ctt cct gaa gat ggt gca gat aat gac	1929
Asn Lys Lys Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp	
610 615 620	
aac ttc cgc atc aaa cgc tat atc tcc aaa tac acc att aat ccc gct	1977
Asn Phe Arg Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala	
625 630 635 640	
ttg acc cat ggc gtg agc gag tat atc ggc tct gtg gaa gag ggc aag	2025
Leu Thr His Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys	
645 650 655	
atc gcc gac ttg gtg gtg tgg aat cct gcc ttt ttt ggc gta aaa ccc	2073
Ile Ala Asp Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro	
660 665 670	
aaa atc gtg atc aaa ggc ggt atg gtg gtg ttc tct gaa atg ggc gat	2121
Lys Ile Val Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp	
675 680 685	
tct aat gcg tct gtg ccc act cct cag ccg gtt tat tac cgc gaa atg	2169
Ser Asn Ala Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met	
690 695 700	
ttt ggg cat cac ggc aag gcg aaa ttt gac acc agc atc act ttt gtt	2217
Phe Gly His His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val	
705 710 715 720	
tcc aaa gtc gcc tat gaa aat ggt gtg aaa gaa aaa cta ggt tta gag	2265
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725 730 735	
cgc aag gtg ctc ccc gtg aaa aac tgc cgt aac atc acc aag aag gac	2313
Arg Lys Val Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp	
740 745 750	
ttc aag ttc aac gac aaa act gca aaa atc acc gtc gat ccg aaa acc	2361
Phe Lys Phe Asn Asp Lys Thr Ala Lys Ile Thr Val Asp Pro Lys Thr	

755	760	765	
ttc gag gtc ttt gta gat ggc aaa ctc tgc acc tct aaa ccc acc tct	2409		
Phe Glu Val Phe Val Asp Gly Lys Leu Cys Thr Ser Lys Pro Thr Ser			
770	775	780	

gaa gtg cct cta gcc caa cgc tac act ttc ttc tag gcataat 2452  
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785 790 795

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Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg  
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50 55 60

Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp  
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85 90 95

Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys  
100 105 110

Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr  
115 120 125

Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser  
130 135 140

His Phe His Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu  
145 150 155 160

Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg  
165 170 175

Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly  
180 185 190

Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp  
195 200 205

Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe  
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Ile Lys  
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His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys

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Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile		
65	70	75 80
Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly		
85	90	95
Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val		
100	105	110
Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr		
115	120	125
Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe		
130	135	140
Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Gly Thr		
145	150	155 160
Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp		
165	170	175
Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val		
180	185	190
Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu		
195	200	205
Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly		
210	215	220
Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr		
225	230	235 240

Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr  
245 250 255

Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr  
260 265 270

His Ile Glu Gly Ala Gly Gly Gly His Ser Pro Asp Val Ile Thr Met  
275 280 285

Ala Gly Glu Val Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro  
290 295 300

Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys  
305 310 315 320

His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser  
325 330 335

Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu His Asp Ile  
340 345 350

Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met Gly Arg Ala  
355 360 365

Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys  
370 375 380

Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp Asn Phe Arg  
385 390 395 400

Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His  
405 410 415

Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp  
420 425 430

Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val  
435 440 445

Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala  
 450 455 460

Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His  
 465 470 475 480

His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val  
 485 490 495

Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Lys Val  
 500 505 510

Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp Phe Lys Phe  
 515 520 525

Asn Asp Lys Thr Ala Lys Ile Thr Val Asp Pro Lys Thr Phe Glu Val  
 530 535 540

Phe Val Asp Gly Lys Leu Cys Thr Ser Lys Pro Thr Ser Glu Val Pro  
 545 550 555 560

Leu Ala Gln Arg Tyr Thr Phe Phe  
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32

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34